instead of at the anterior border of the middle third; in consequence of which the kidneys do not nearly reach to these origins.

The individual from Pasir Panjang was, in life, coloured orange, with the tip of the tail black.

5. Phascolosoma pellucidum Keferstein.

Selenka, *tom. cit.* p. 32.

*Loc.* Singapore. Pasir Panjang; one specimen.

Malacca. Pulau Jawi; two specimens, from under deep stones.

Selenka says in regard to the kidneys in this species: "Segmentalorgane von halber Körperlänge." Keferstein, on the other hand, says: "Segmentalorgane kurz"; and his figure accords with this description. These specimens agree with Keferstein's description in this respect; the kidneys are only one-sixth of the length of the body in the individual from Singapore, a little more than one-sixth in those from Malacca.

There are no hooks on the introvert in any of these examples, and in those from Malacca the retractors are notably thicker than in the Singapore specimen.

On the tails of these individuals (*i. e.* from both localities) is fixed a species of the Entoproctous Polyzoan *Loxosoma*, which Dr. Harmer has kindly undertaken to examine.

### III. Genus Physcosoma.

6. Physcosoma scolops Sel. & de Man.

Selenka, *tom. cit.* p. 75.

*Loc.* Singapore. Raffles Lighthouse; two specimens. S'alat Sinki (strait between Pulau Brani and Blakang Mati), 5 fathoms, bottom of mud and stones; one small specimen.

In one example, the largest, the introvert is even longer than the body, being $1\frac{1}{8}$ times the length of the latter. As regards the longitudinal muscle-bands, there are only 17–19, instead of 20–21; the retractors, moreover, do not fuse till very far forward in the introvert.

## 5. The Marine Fauna of Zanzibar and British East Africa, from Collections made by Cyril Crossland in the Years 1901 and 1902.—*Gephyrea*. By W. F. Lanchester, M.A., Assistant Lecturer and Demonstrator in Zoology in University College, Dundee *.

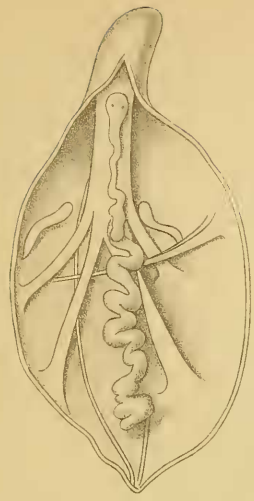
[Received November 1, 1904.]

(Plate I.†)

This collection was made by Mr. Crossland in East Africa during the years 1901–1902; it includes in all examples of 20 species,

* Communicated by the Secretary.

† For explanation of the Plate, see p. 35.



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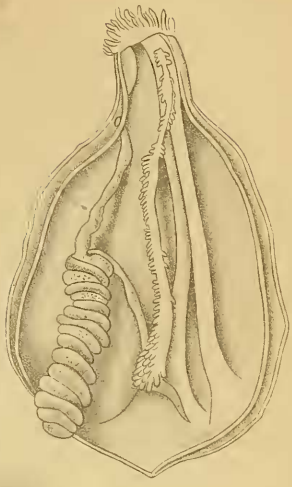

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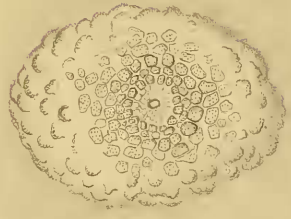
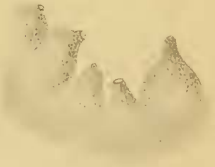
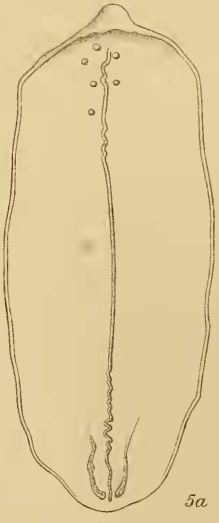


1b

2a

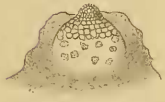


4b



5a

1c



1a

5b

E Wilson, Cambridge

GEPHYREA FROM ZANZIBAR.

16 being Sipunculids and 4 Echiurids. Of the Sipunculids three, and of the Echiurids one, are new; the latter, a *Thalassema*, presents the novel feature of four pairs of nephridia, the greatest number hitherto met with in that genus. Unfortunately the Echiurids are not at all well preserved, and it is evident that the preservation of these animals needs even more careful attention than in the case of the Sipunculids. In this group, moreover, I notice that, whether due to contraction or otherwise, the nephridia and anal trees are apt to lose their characteristic appearance, the nephridia appearing small or even absent, and the anal trees simple in a species in which they are really dendritic.

## Sipunculida.

### I. Genus Sipunculus.

1. Sipunculus indicus Peters.

Arch. f. Anat. u. Phys. p. 382 (1850).

*Loc.* Pemba Island.
*Hab.* From the eastern reefs in sand near the shore.
Two large specimens, the internal organs of which are not sufficiently well preserved to enable me to add anything to our knowledge of their general anatomy.

2. Sipunculus edulis Lamarck.

Sluiter, Natuurk. Tijds. Nederl. Ind. xlv. p. 484 (1886).

*Loc.* Chwaka Bay, Zanzibar.
*Hab.* Shore at low tide.
Several examples; in one of which the transverse dissepiments are absent.

3. Sipunculus cumanensis Kef.

Selenka, Die Sipunculiden (Semper's Reisen, iv. p. 104).

*Loc.* Chwaka Bay, Zanzibar.
Three specimens corresponding with Grube's var. *semirugosus*.
*Loc.* Zanzibar.
Two specimens of var. *vitreus*.

4. Sipunculus titubans Sel. & Bülow.

Selenka, *tom. cit.* p. 57.

*Loc.* Chwaka Bay, Zanzibar; two large specimens.
This is a very clearly defined species, and these specimens agree closely with the description. The only comment I have to make on the original account is that, so far at least as concerns these examples, the papillæ on the introvert, though certainly "von dreieckiger Form," are not so obviously so as in the case of *S. indicus*: the angles are rather softened down. This character together with the relative positions of the nephridial and anal

openings serve to clearly distinguish it, externally, from the latter species, to which it appears at first sight very similar.

This species, originally known from America, has also been described by Fischer from Madagascar.

5. Sipunculus billitonensis Sluiter.

Natuurk. Tijdschr. Ned. Ind. xlv. p. 487.

*Loc.* Pemba Island.

*Hab.* From eastern reefs in sand near the shore.

One specimen.

6. Sipunculus australis Kef.

Selenka, *tom. cit.* p. 90.

*Loc.* Chwaka Bay, Zanzibar.

One specimen.

This specimen, a large one, agrees in all features with Selenka's description, but is without any hooks on the introvert. The presence of hook-bearing individuals in species that normally possess no hooks has already been recorded, but I am not aware of an instance being known of the opposite phenomenon. That some of the hooks may drop off is, however, recognised, and it would seem that we have here the same occurrence carried to completion, owing either to age or causes that cannot be definitely specified. Of course we may be dealing with a case of local variation, but of this there is no evidence.

## II. Genus Physcosoma.

7. Physcosoma scolops Sel. & de Man.

Selenka, *tom. cit.* pp. 75–76.

*Loc.* British East Africa.

*Hab.* Among coral at low tide; 2 specimens. Muddy shore at low tide; 1 specimen. 10 fathoms; 4 specimens.

*Loc.* Chwaka Bay, Zanzibar; 1 specimen.

These individuals correspond with the variety *mossambicense* of Selenka and de Man, in which the dark lines bordering the clear spaces in the hooks are curved and not bent at an angle. The accessory process varies, in the hooks of an individual, from being present as a distinct small *tooth* through intermediate stages to complete absence.

8. Physcosoma nigrescens Kef.

Selenka, *tom. cit.* p. 72.

*Loc.* Zanzibar Channel, 5 fathoms.

One specimen in which, as in Selenka's Mauritius form, the papillæ on the base of the introvert are slightly larger than those on the body, and the hooks slightly different.

*Loc.* Chwaka Bay.

One large specimen. The longitudinal muscles do not anastomose immediately in front of the anus, but extend a little distance up the introvert. Hooks typical.

9. Physcosoma eviscerатum, sp. nov. (Plate I. fig. 1.)

*Loc.* Chwaka, Zanzibar.

There is only a single specimen present, in which all the internal organs, including even the muscle-layers, have entirely disappeared. The part of the introvert that bears the tentacles is also broken away. But the hooks and papillæ present features which prevent me from placing the specimen in any known species.

The introvert is as long as, or a little longer than, the body; it is not possible exactly to mark the limit between the two, so that perhaps, roughly speaking, it is better to describe them as equal in length, the introvert being at any rate not shorter than the body. Both are covered entirely, except for a small piece at the extreme anterior end of the introvert, with large conical papillæ, which are largest at the extreme hind end and smallest in the middle of the body; generally colourless, at irregular intervals over the body a single papilla appears dark-brown and very distinct as against its surroundings. The appearance of the papillæ under the microscope is shown in Pl. I. figs. 1 *a* & 1 *b*; those from the hind end are characteristically raised, in their basal regions, into small secondary papillæ.

The rows of hooks are numerous. In the region behind the mouth I find 15 rows (but these may in reality be more numerous, allowing for the tearing above mentioned); then comes a narrow interval, and again some 15 rows of hooks, and then after a similar interval 30 rows. All the hooks are alike in structure; fig. 1 *c* gives a representation of one, and the characteristic feature to which I wish to draw attention is the presence of a distinct process projecting from the dark curved line bounding the convex border of the light central area and encroaching on the latter.

Finally the body, which is markedly broader than the introvert, is unpigmented save for the isolated papillæ mentioned above; while the introvert is more or less brown, the coloration tending to be concentrated along a line that is probably either mid-dorsal or mid-ventral; only the narrow areas which separate the three areas of hooks are whitish.

## III. Genus Phascolosoma.

10. Phascolosoma semperi Sel. & de Man.

Selenka, *tom. cit.* p. 37.

*Loc.* Chwaka Bay; two specimens.

On one of these Mr. Crossland has the following note: "Opaque white skin like fine sand-paper in appearance."

11. Phascolosoma vulgare Blainv., var. nov. selenkæ. (Plate I. fig. 2.)

*Cf.* Selenka, *tom. cit.* p. 23 (1883); and var. *tropicum* Sluiter, Siboga-Exp. p. 33 (1902).

*Loc.* British East Africa, 10 fathoms; 2 specimens, small. Chwaka, Zanzibar; 2 specimens, large.

These individuals evidently correspond with a form described by Selenka from the Red Sea, which differed from the type in the following particulars: the papillæ on the hind end were a little shorter and thicker, the hooks a little shorter, and the ventral retractors tending to be inserted a little more posteriorly. Selenka was unwilling to establish a variety on a single specimen, but it would seem better, now that we have these additions, to distinguish the form as a variety. The papillæ on the introvert are exactly similar to those on the hind end of the body; but even shorter and broader. I figure these, and one of the hooks (*v.* figs. 2 *a*, 2 *b*).

12. Phascolosoma glaucum, sp. nov. (Plate I. fig. 3.)

*Loc.* Zanzibar Channel, 10-15 fathoms.

In this species, which is represented by a single specimen, there are no hooks, and only two retractors. The muscle-layers are so loosely attached to the skin that they readily tear away from it on opening the animal; the retractors themselves arise, as strands obviously split off from the longitudinal layer of the muscle-system, from the anterior border of the hinder quarter of the body, and meet each other round the œsophagus at the level of the base of the introvert. The body is 13 mm. (approximately) in length, the introvert 5 mm. only; the latter has a slightly darker tinge, owing to the crowding together of the pigmented papillate bodies, which are very low and not visible to the unaided eye, but distinctly so with the lens, under which they appear as distinct black spots. The papillæ on the body are visible under the lens as distinct clear spots; under the microscope they appear as elongated bodies with a clear apical opening and carried on fields roughly oblong in shape.

Internally, we find the œsophagus running back with the retractors as far as their insertion, and then bending sharply forward for a little distance before entering the intestine; the latter contains about 16 spiral turns, and is not attached to the hind end of the body. The rectum is without a diverticulum, and opens by the anus just behind the level of the base of the introvert. Two muscle-strands support the intestine anteriorly, and two more, arising from close to the nerve-cord on each side of it, support the œsophagus at the angle where it bends forward. There is a contractile vessel, thickly beset with little diverticula, along the length of the œsophagus where it lies between the retractors. The nephridia are colourless, and open just in front of the level of the anus.

13. Phascolosoma wasini, sp. nov. (Plate I. fig. 4.)

*Loc.* Wasin, British East Africa; 10 fathoms.

Six specimens, of which the largest is 15 mm. in length. The most characteristic feature of this species is the numerous rows of

hooks of the *Physcosoma* type that lie in the introvert. Generally the hooks in *Phascolosoma* are simple, slightly curved structures, and in only one other form, the *Ph. papilliferum* of Keferstein (=*Ph. dissors* Sel. & de Man), do the hooks, so far as I know, acquire the features that are generally found in those of a *Physcosoma*, namely the greatly curved apex borne on a broad base, the more or less sharply differentiated clear central space, and often an accessory lobe. As regards the internal anatomy, the following are the most important features :—There are four retractors, of which the ventral arise fairly close to the nerve-cord and just behind, the dorsal just in front of, the middle of the body; these unite very soon to enclose the œsophagus, above which lies the simple contractile vessel. The intestine is not much twisted, and the rectum, which is moderately long, opens a little in front of the origin of the dorsal retractors; a little in front of the anal opening again are the openings of the nephridia, which latter are short, rather broad, and unpigmented. The intestine is held to the hind end of the body by a fine muscle-strand, and two other somewhat stouter strands run (*a*) from the left side of the nerve-cord to the commencement of the intestine, and (*b*) from near the anus, along the rectum, to the intestine. Two very distinct eye-spots may be seen just above the mouth.

Externally the body is covered with numerous, conical, often brown-coloured papillæ; in the middle, however, these are lower, less numerous, and more finger-shaped. These papillæ, moreover, extend a little way up the introvert, gradually becoming fewer and lower, till they reach the rows of hooks (which reach more than halfway back along the introvert); in between the rows they appear as flattened elliptical bodies with a conspicuous central opening.

## IV. Genus Cloeosiphon.

14. Cloeosiphon aspergillum Quatrefages.

Selenka, *tom. cit.* p. 126 (1883).

*Loc.* Chwaka Bay, Zanzibar; 2 specimens. British East Africa; 1 specimen.

## V. Genus Aspidosiphon.

15. Aspidosiphon elegans Cham. & Eysenh.

Selenka, *tom. cit.* p. 124 (1883); Sluiter, Natuurk. Tijdschr. Ned. Ind. l. p. 116 (1890), and Siboga-Exp. p. 19 (1902).

*Loc.* Wasin, British East Africa.

*Hab.* Among coral, at low tide.

Several specimens. In Selenka's key to the species of this genus he includes *A. elegans* amongst those in which the anal shield is calcified. But there is certainly no calcification in the specimens I have seen, nor does Selenka mention the fact in his description.